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Delivering your power

MARINUS LINK

# Response to TSBC/Goanna Energy findings as presented during ECA webinar

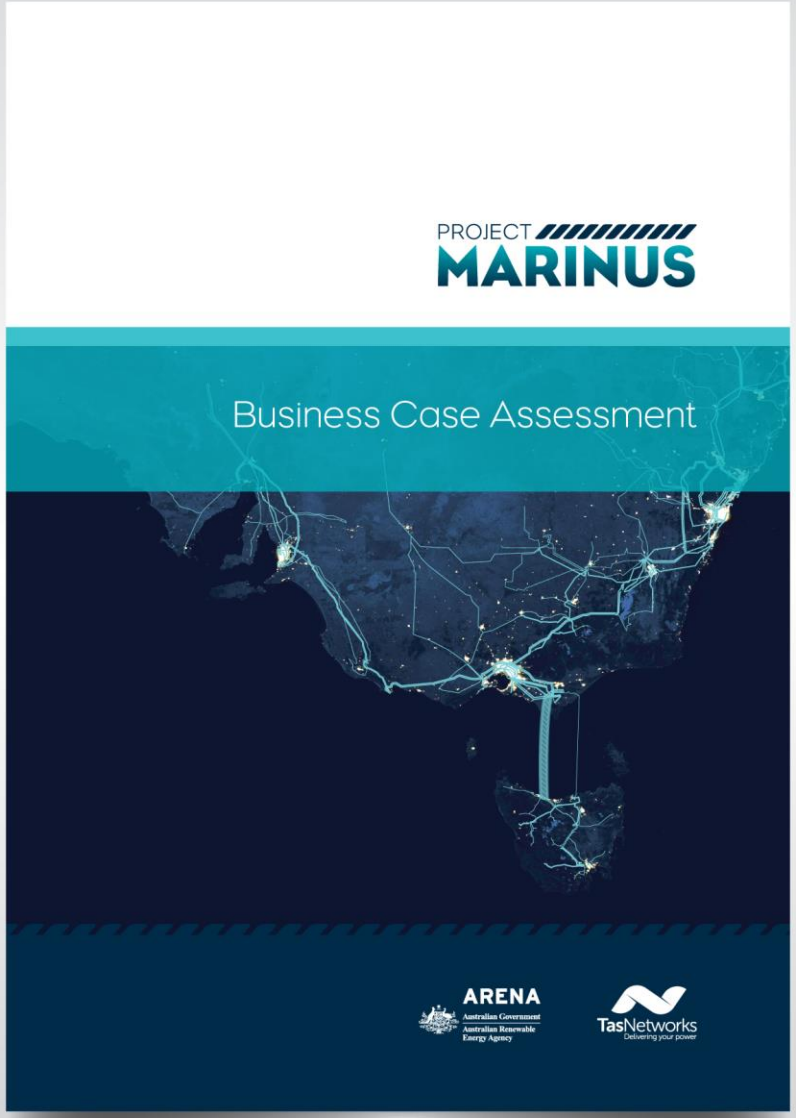
July 2020

Confidential

# A POSITIVE BUSINESS CASE.

In December 2019 TasNetworks released:

- the Business Case Assessment Report
- the Regulatory Investment Test for Transmission (RIT-T) Project Assessment Draft Report (PADR)

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# DELIVERING LOW COST, RELIABLE & CLEAN ENERGY

MARINUS LINK

# Why do we need Marinus Link? Our national energy challenge

Australia's energy market is undergoing a significant transformation.

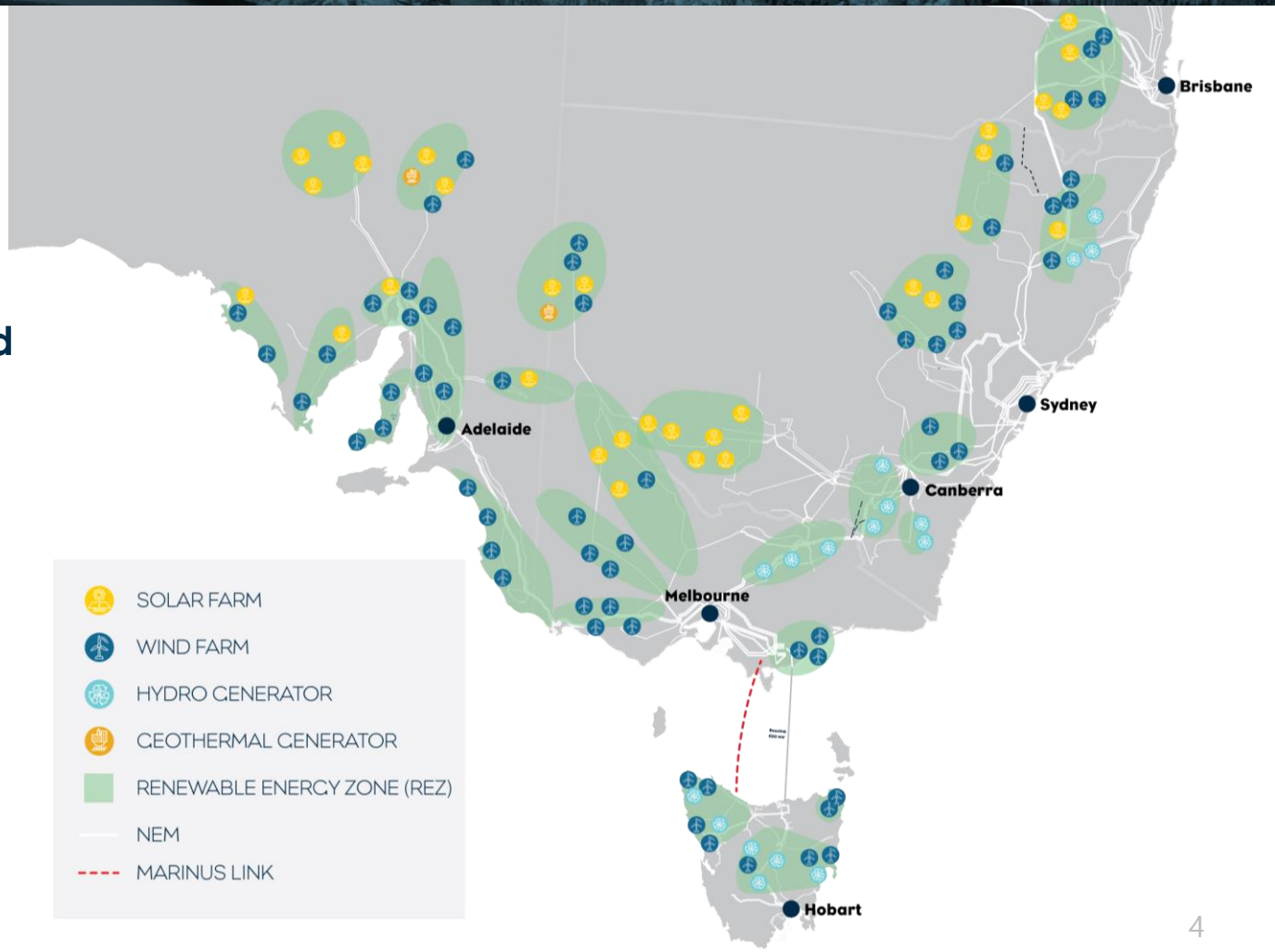
## Energy mix and infrastructure transforming from:

- **coal and gas** resources
- Supporting transmission infrastructure **based on thermal generation**

## Changing to:

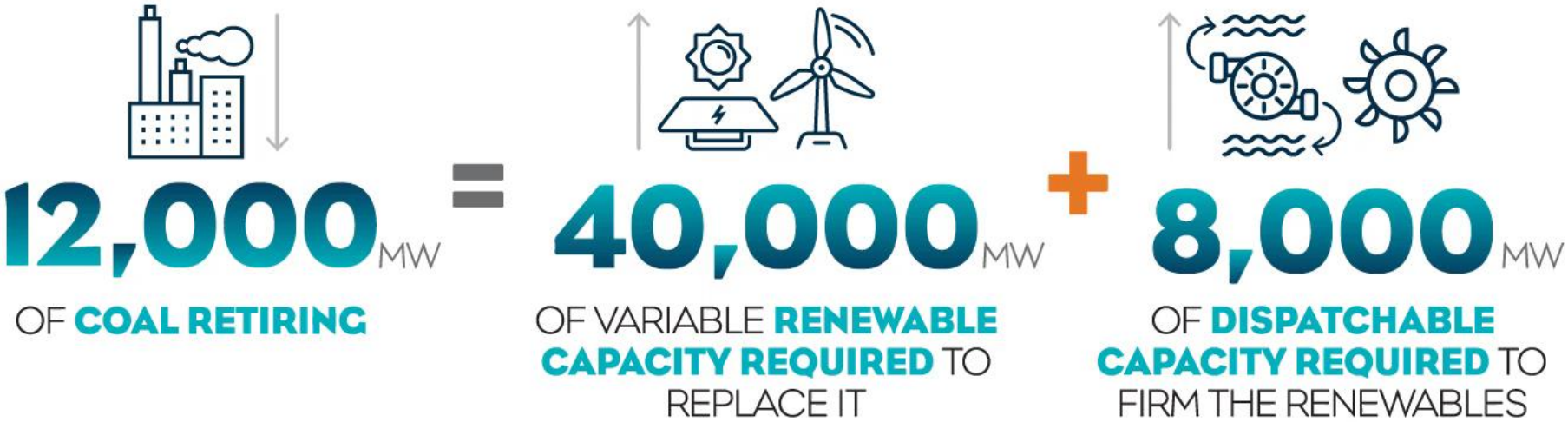
**A portfolio of** technologically and geographically **diverse renewables**, **supported by**:

- Flexible thermal plant
- Energy storage
- Transmission



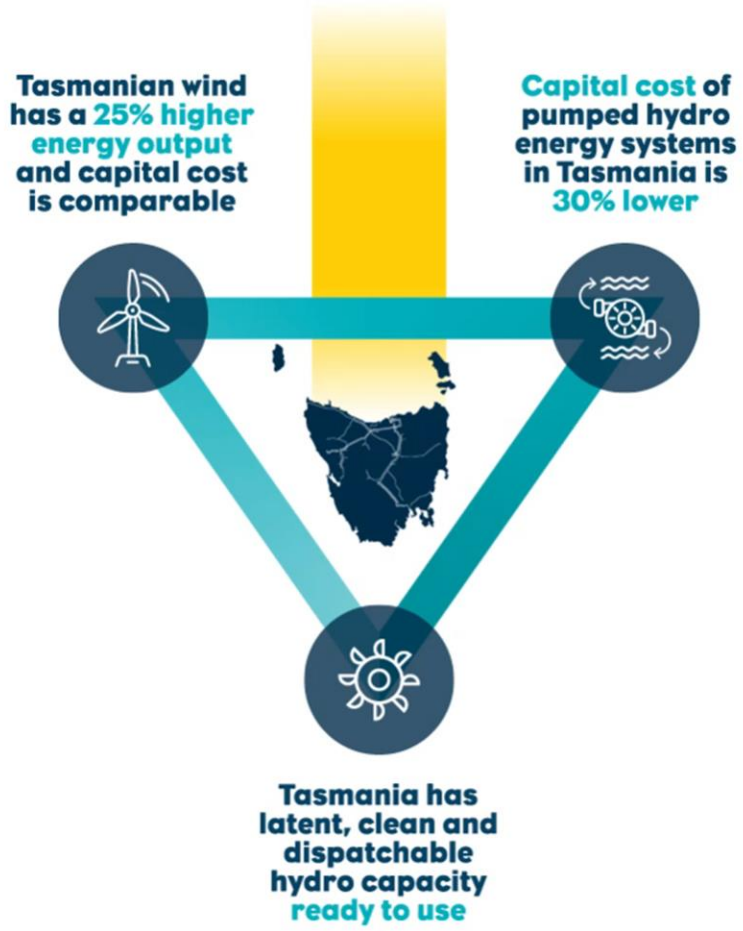
# AN ENERGY SECTOR IN TRANSITION

**By 2035 in the NEM**




*Note:*
1. *Dispatchable capacity requirement is in addition to Snowy 2.0 (2040 MW)*
2. *Source: TasNetworks modelling for Marinus Link PADR*

# Tasmanian Value Proposition




- Unlocks Tasmania's renewable energy and storage resources
- Delivers low cost, reliable and clean energy
- Technically and financially feasible for up to 1500 MW capacity delivered in two 750 MW links

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# ECONOMIC ANALYSIS AND TIMING CONSIDERATIONS

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# What is the regulatory process for assessing transmission projects?

- The Regulatory Investment Test for Transmission (**RIT-T**) is a regulatory mechanism defined in the National Electricity Rules that applies an economic cost-benefit test on new electricity infrastructure proposed for the National Electricity Market (**NEM**).
- According to the Australian Energy Regulator (**AER**):
  ***"The purpose of the RIT-T is to identify the credible option that maximizes the present value of net economic benefit to all those who produce, consume and transport electricity rules."***
- The role of the RIT-T is to undertake a cost benefit analysis focusing on different technical solutions by looking in detail at engineering aspects, refining costs, considering alternate options, and staging.

# ROBUST ASSESSMENT PROCESS – RIT-T & Actionable ISP rules

- Cost benefit analysis of an increase of transmission capacity between Victoria and Tasmania
- Passing the RIT-T allows the Australian Energy Regulator (AER) to determine a revenue allowance
- Provides confidence for customers of a transparent, robust and independent process
- Confidence for owners and lenders, with a commercial rate of return consistent with regulatory framework, providing stable returns for long-life asset


Regulatory Investment Test – Transmission (RIT-T)

# Marinus Link is part of "critical" infrastructure in NEM ongoing energy transition as identified in 2020 ISP

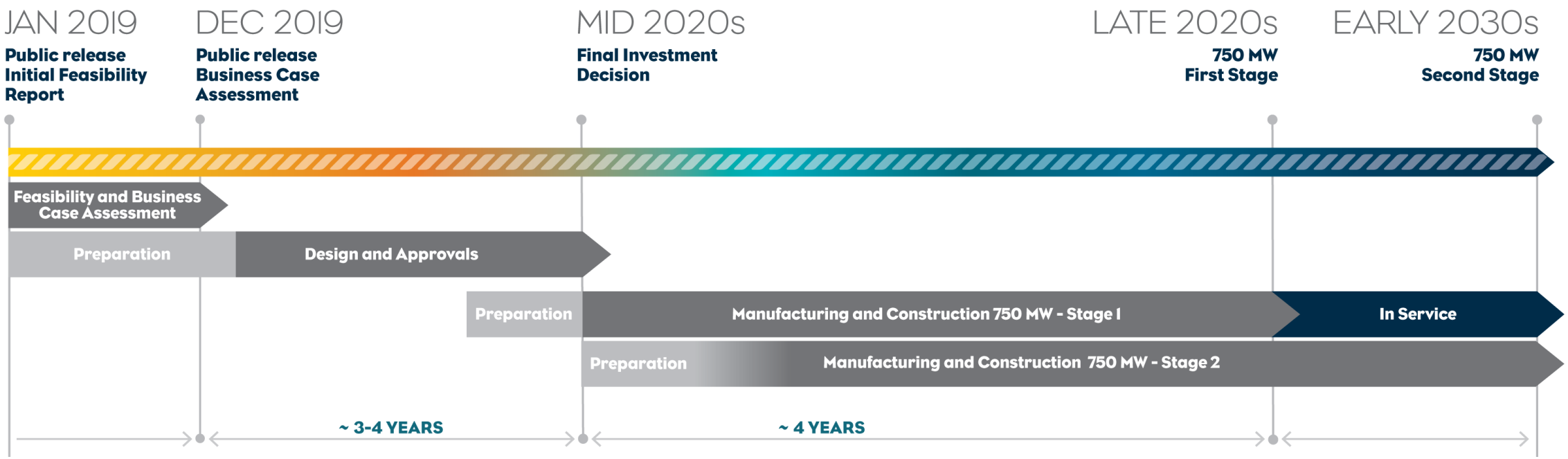
- Marinus Link is an Actionable Project with decision rule in the 2020 ISP scenarios. The decision rules include
  - Resolution of fair cost allocation for interconnectors;
  - Legislation of Tasmanian Renewable Energy Target; and,
  - NEM is not in a 'Slow Change' scenario[1].

| | Scenarios | | | |
|---|---|---|---|---|
| **Stage** | **Step Change** | **Fast[2]** | **Central** | **High DER** |
| **Link 1** | ***2028*** | ***2031*** | ***2031*** | ***2031*** |
| **Link 2** | ***2031*** | ***2034*** | ***2035*** | ***2034*** |



1. *Slow Change Scenario roughly equates to extension of technical life to coal generation stations and significant reduction in large industrial load.*
2. *With a regret cost of $14 million.*

# Working timeline



# TasNetworks has continually engaged with stakeholders regarding Marinus Link

| Year | Quarter | Stakeholder discussions | Sessions included |
|---|---|---|---|
| 2019 | Jan - Mar | 10 | Initial feasibility launch event (Burnie), OTTER's Customer Consultative Committee (Hobart), Goanna Energy (Project Marinus & Reset) |
| 2019 | Apr - Jun | 5 | TasNetworks Customer Council, TasCOSS (Centre of Social Service) and COTA (Council of the Ageing), OTTER |
| 2019 | Jul - Sept | 13 | Goanna Energy (twice), TMEC, TasNetworks Policy and Regulatory Working Group |
| 2019 | Oct - Dec | 6 | TasNetworks Customer Council, Goanna Energy (twice) |
| 2020 | Jan - Mar | 8 | PADR RIT-T forums (3), TasNetworks Generator forum, OTTER |

CRADLE COAST
FUTURE ENERGY HUB

# WORKING OUT WHO PAYS

- Marinus Link benefits the whole of the NEM but current pricing frameworks restrict recovery from Victorian and Tasmanian customers.
- Fair cost allocation methodology for interconnectors was raised in Marinus Link PADR and an accompanying discussion paper was also released.
- Issue recognised by Council of Australian Governments (**COAG**) Energy Council; Energy Security Board (**ESB**) to provide advice on a fair cost allocation methodology for interconnectors.
- TasNetworks is participating in this process

# Is the RIT-T suited to interconnector projects?

- RIT-T has been subject to numerous reviews and refinements
- In 2017, COAG Energy Council competed its review of the RIT-T, which concluded that:

**"The RIT-T remains the appropriate mechanism for the assessment of any strategic interconnection investments to enhance system security and competition in the NEM.**" COAG Energy Council

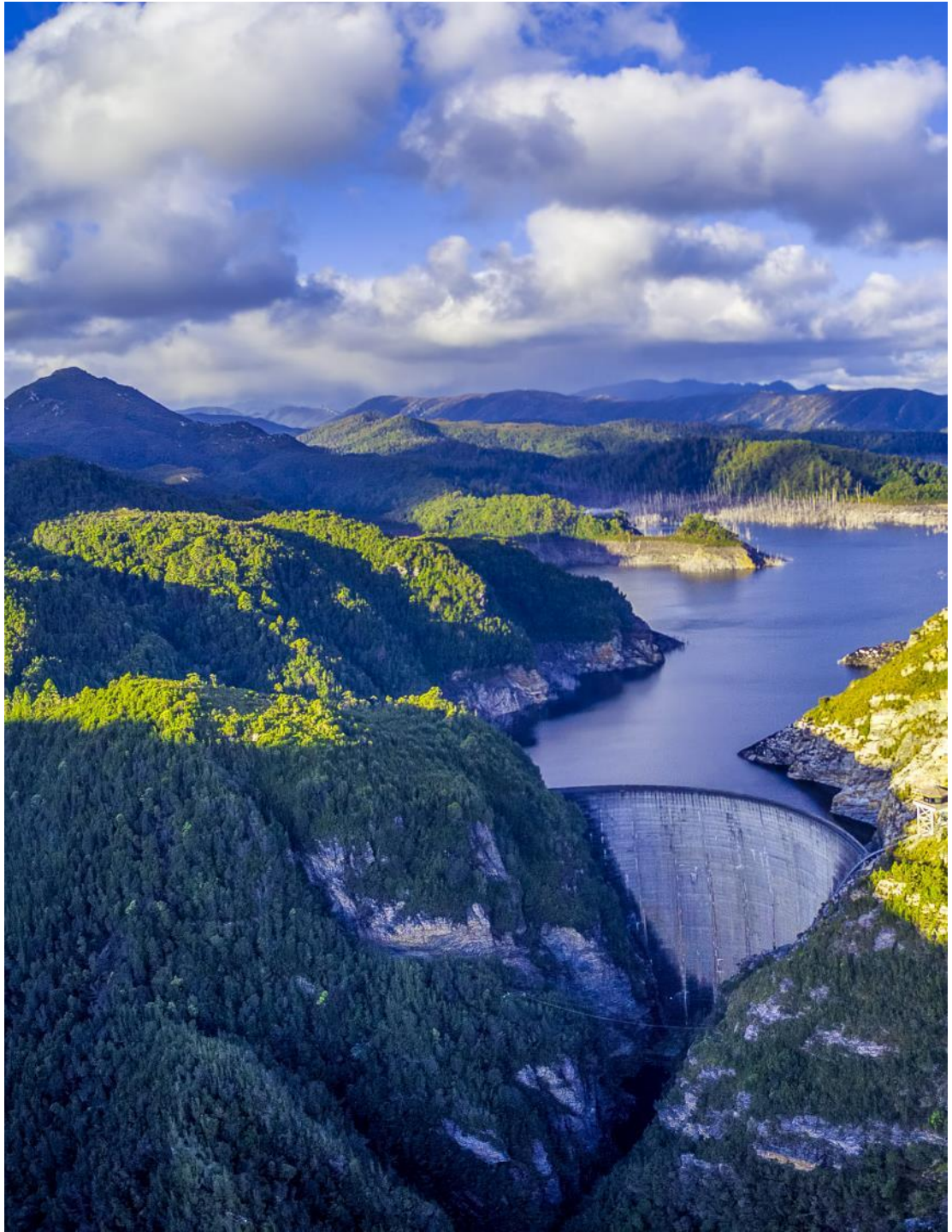
"**The RIT-T is designed to identify the most efficient regulated investment in transmission infrastructure, whether intra- or inter-regional in scale, and ultimately protect consumers from paying more than necessary for their supply of electricity**." COAG Energy Council, 2017.

# The best way to assess risk

- Changing the discount rate is not the best way to assess risk.
- AER's ISP guidelines state:

> ***"The discount rate should not generally be used to manage uncertainty over predicted costs and benefits. This is because it is typically best practice to capture this uncertainty through sensitivity testing and scenario analysis, rather than through the choice of discount rate."***

- Through the RIT-T process, extensive sensitivity testing and scenario analysis has been undertaken on Marinus Link.
- Our analysis and recent ISP findings confirm that as thermal generation fleet retires, the least-cost transition of the NEM will be to a highly diverse portfolio consisting of distributed energy resources (DER) and variable renewable energy (VRE) along with strategic investments in transmission infrastructure and dispatchable capacity.



# Capital costs

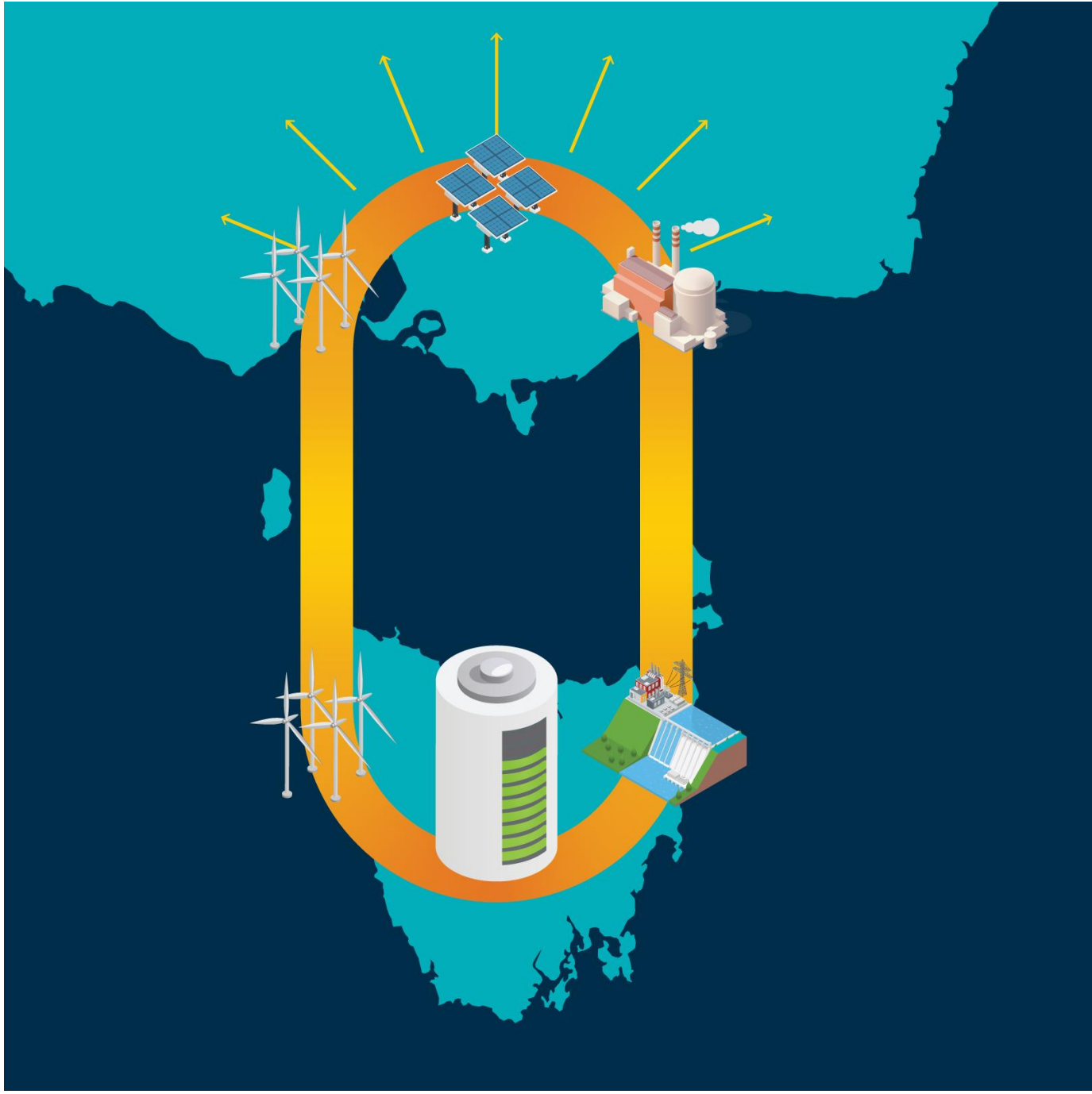
- TasNetworks has modelled capital costs in accordance with the RIT-T guidelines.
- Cost estimates in RIT-T do not include contingencies. This approach is consistent with Infrastructure Australia and Australian Government guidelines.
- Recent AER determination on Project EnergyConnect provides assurance to consumers that regulatory processes may need to be undertaken again in case of project cost escalations.
- Capital costs sensitivity analysis was also examined in the Marinus Link PADR.
- Costs will be kept under constant review and the project revisited if there is a material change in circumstance.

# Future proofing the NEM

- Interconnector investments are long lived assets

- It is widely accepted that the changes in the market require more interconnection, not less:

  "***Significant investment decisions on interconnection between states should be made from a NEM-wide perspective, and in the context of a more distributed and complex energy system***" Finkel review, June 2017.



# Positive case for Marinus

- The RIT-T guidelines require optimal commissioning of infrastructure therefore Marinus Link **benefits exceed costs from the first year of operation**.

- PADR modelling of Marinus Link suggests benefits of over $1.6 billion on a scenario weighted basis, with benefits of up to $ 3 billion if decarbonisation policy in accordance with Paris climate agreement is pursued.

- AEMO's independent modelling in its ISP confirms that Marinus Link is on the optimal development path.

- Analysis shows that a decision not to build Marinus Link would lead to higher costs for customers.

- Marinus also supports the proposed Tasmanian Renewable Energy Target to double Tasmania's renewable energy production by 2040.

# ECONOMIC CONTRIBUTION – Marinus Link construction & operations

## TASMANIA

AT LEAST

$1.4BN

ECONOMIC STIMULUS CONSTRUCTION + OPERATION

AND

**1400**

JOBS

DIRECT AND INDIRECT JOBS AT PEAK CONSTRUCTION

## VICTORIA

AT LEAST

$1.5BN

ECONOMIC STIMULUS CONSTRUCTION + OPERATION

AND

**1400**

JOBS

DIRECT AND INDIRECT JOBS AT PEAK CONSTRUCTION

* JOBS FIGURES ARE ESTIMATED FOR THE PERIOD SPANNING 2025-27. ALL FIGURES ARE ESTIMATES BASED ON ERNST & YOUNG MODELLING NOVEMBER 2019.

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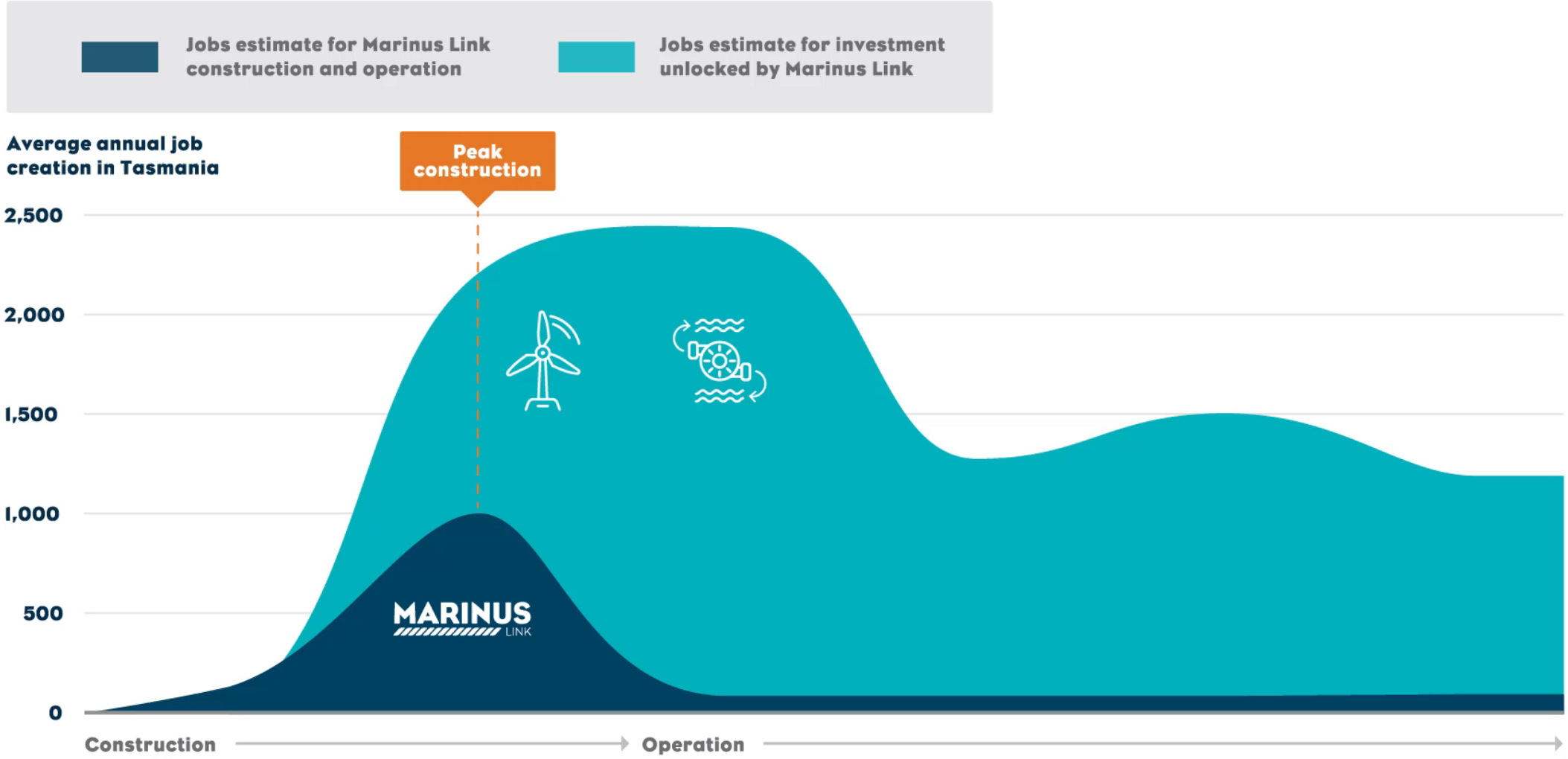
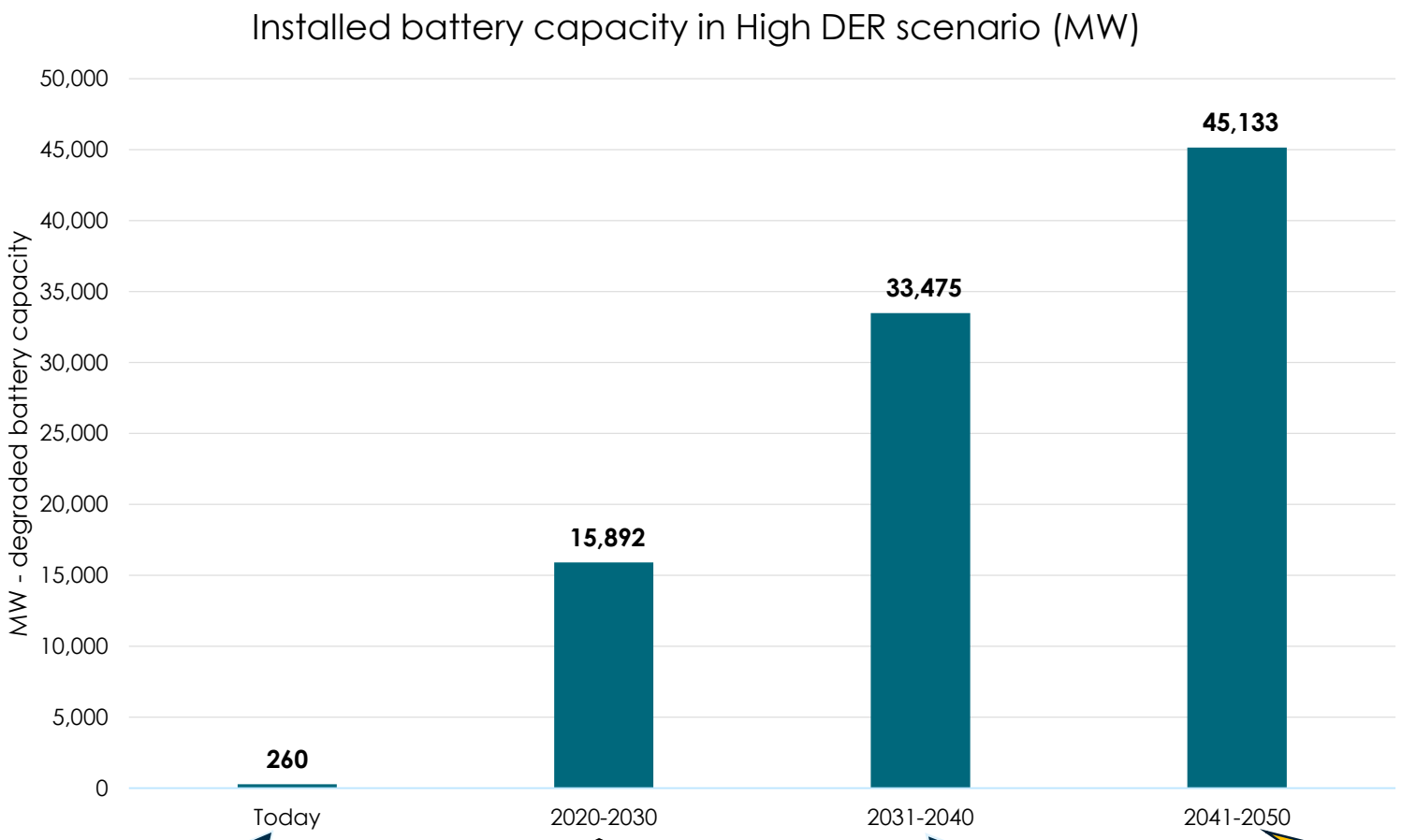
# SIGNIFICANT BROADER ECONOMIC CONTRIBUTION



# Marinus is still needed even with significant growth in battery capacity




Includes existing and anticipated batteries. Final 2020 ISP

(2020-2030) Installed capacity equivalent to a new Hornsdale battery installation every month.

(2040) Up to two-third of Australian households in NEM have Tesla Powerwall

(2050) Total cost of batteries purchased by customers = $34 Billion [$2019]

- AEMO's High DER scenario includes 45,000MW of installed battery capacity.
- Growth in battery capacity is exogenously committed through this scenarios and does not rely on least cost economics.
- AEMO's modelling confirms Marinus is still required under the High DER scenario.
- Marinus Link has some significant advantages compared to batteries (see Appendix).

# In conclusion

- TasNetworks has adopted a transparent and consultative approach when undertaking economic analysis for Marinus Link. We have demonstrated this by:
  - Undertaking to conduct a supplementary analysis, following the publication of our PADR, for better alignment with 2020 ISP.
  - Conducting PADR industry forums in three cities and various one on one engagements with stakeholders.
  - Becoming the first RIT-T proponent to release detailed data from market modelling.
- TasNetworks welcomes the opportunity to discuss our economic modelling insights with stakeholders.

# APPENDIX

MARINUS LINK



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# Marinus Link is comparable to…

## Grid Scale Storage

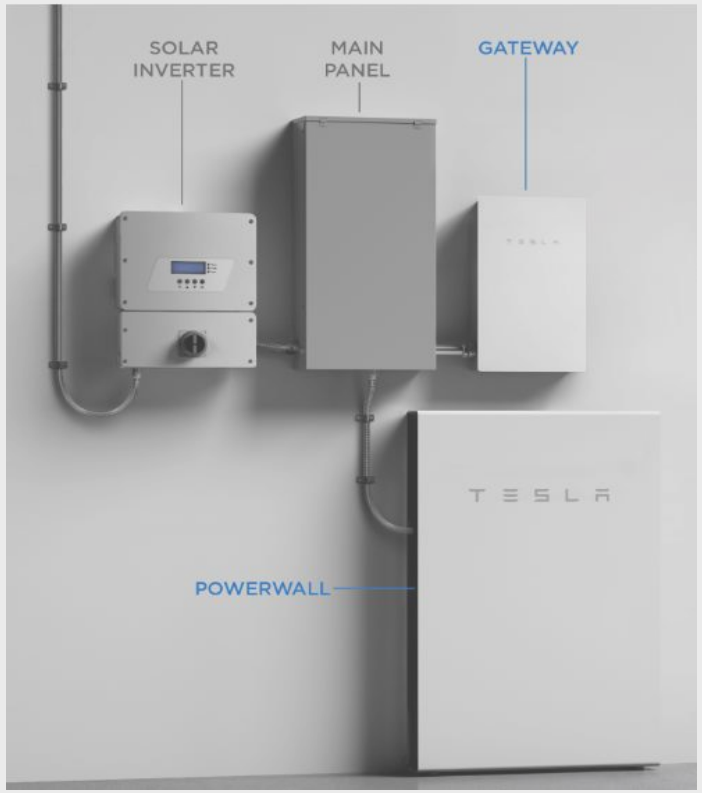
**140 x Hornsdale Power Reserves**

**(Cost ~$12.5bn) 10-15 year life**

## Home Storage

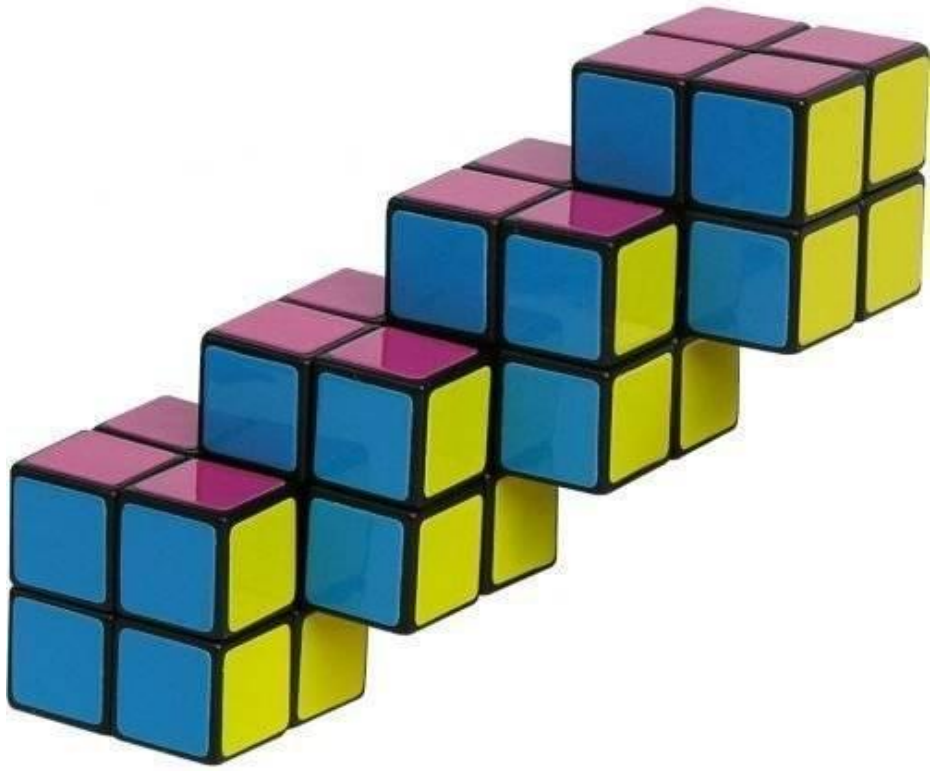
**1,300,000 x Tesla Powerwalls**

**(Cost >$15bn) 10 year life**



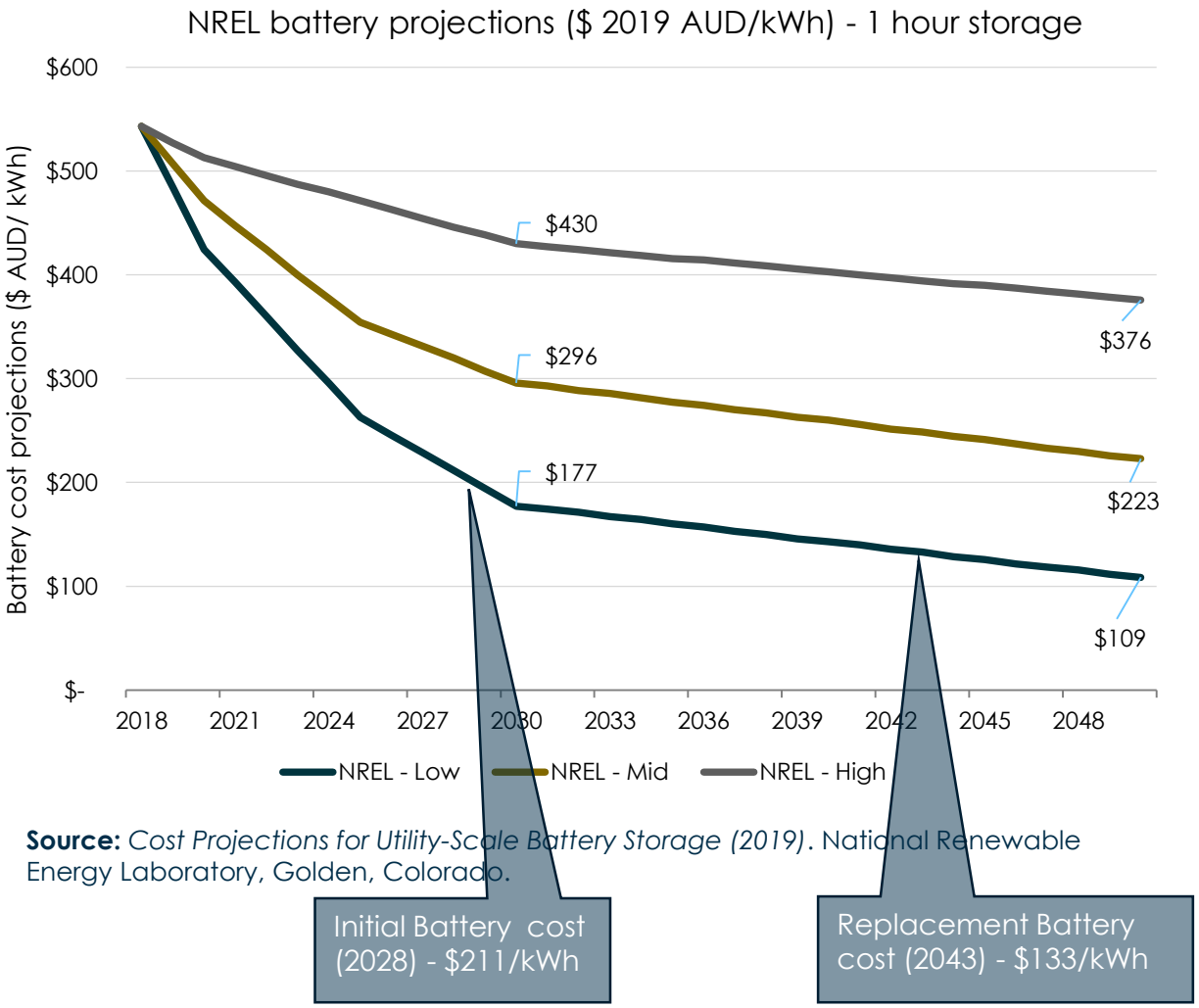
# Modelling overview and associated complexity…

- Modelling conducted at hourly granularity that solves dispatch intervals for 30 years (FY21 – FY50) simultaneously. A ***total of 262,800 dispatch intervals*** with outcomes for each generator, interconnector and corresponding demand trace in the NEM.
- The modelling involves approximately 100 million variables and 50 million constraints. The overall problem size of the matrix is approximately 300 million non zero elements.
- A single simulation typically takes between ***24-48 hours to solve***.
- Model utilises 8 year historical trace for hydro, wind and solar availability. This trace includes ***concurrent wind and hydro drought years***.
- More intricate modelling details can be shared.



# Battery cost projections and other assumptions

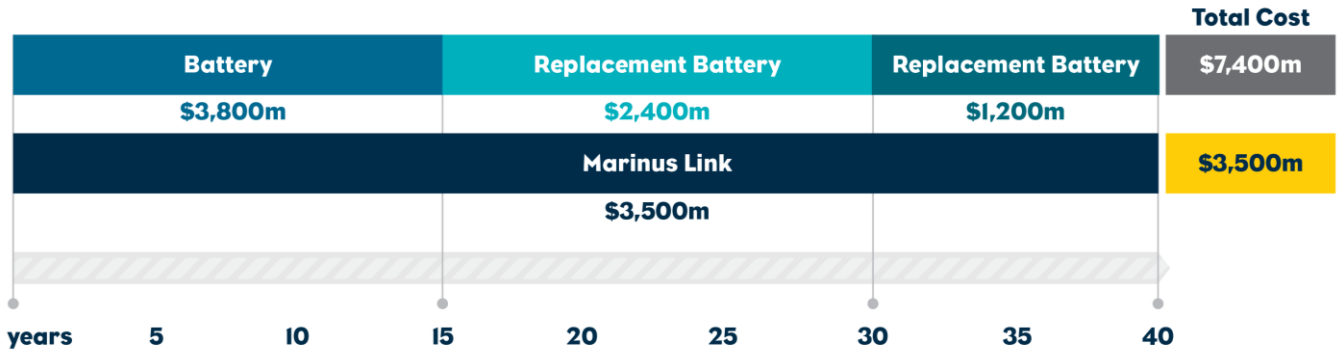
- National Renewable Energy Laboratory (**NREL**) published a cost projection for utility-scale battery storage based on their analysis and 25 other publications.
- The projections consider three different scenarios and under the lowest cost scenario, battery costs are expected to reduce by 70% in the next 10 years.
- The study found the typical battery life to be 15 years.
- In comparison, Marinus Link has a 40 year life, with an option to extend life further with a mid-life retrofit.
- Marinus Link is backed with deep Tasmanian storage but for this analysis, it is conservatively assumed to be 12 hours in duration.

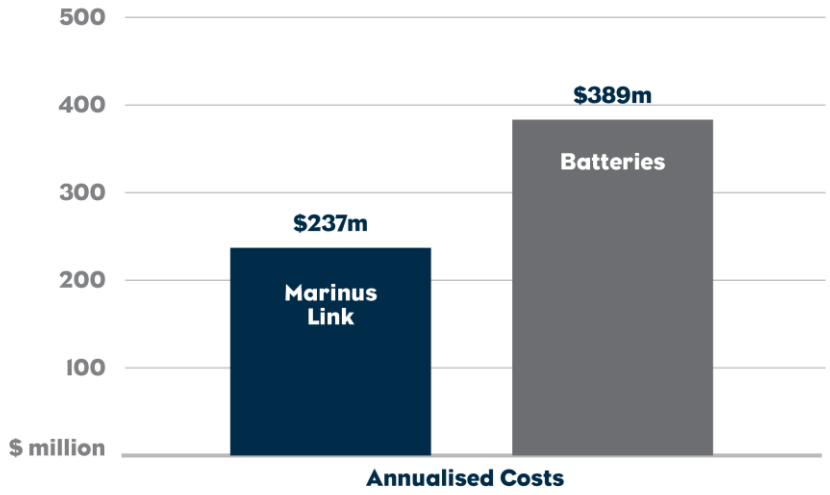



**Source:** *Cost Projections for Utility-Scale Battery Storage (2019)*. National Renewable Energy Laboratory, Golden, Colorado.

# Cost of Marinus Link is significantly lower than the utility scale battery solution

- The longer technical life and deeper storage duration of Marinus Link provide a more cost-effective option than lowest cost battery storage projection.
- Battery life will depend upon cycle rate.




**Notes:**

1. WACC of 5.9% is used for the analysis.
2. Marinus Link has an operating expenditure of $20 million and based on NREL studies operating expenditure of batteries is 2.5% of capital costs.
3. The second battery replacement cost (year 30-40) is prorated to 10 years so the period is comparable to Marinus Link technical life.
4. Lowest cost projections (blue line in previous chart) from NREL forecasts is used.
5. NREL cost projections are in USD. An exchange rate of 1 AUD = 0.7 USD is used for the analysis.
6. The cost of Marinus Link and batteries are in $2019.
7. The cost of battery refurbishment and potential future environmental costs are not accounted for in this analysis.